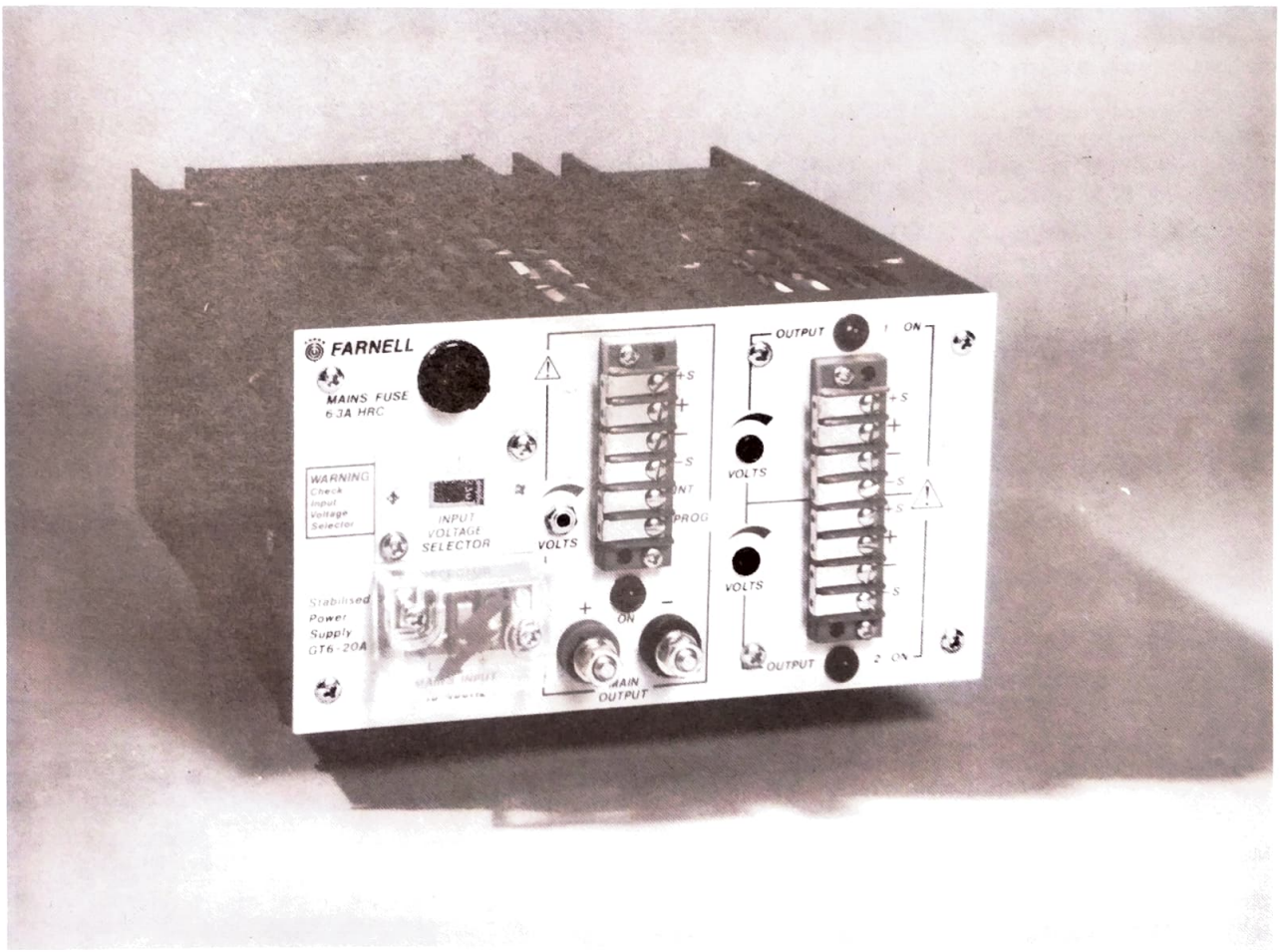
Publication PS29

Farnell

triple output power supply GT6-20A



Switched-mode technique on main output for compactness and high efficiency.

220-240V or 115-120V ±10% 45-440Hz input selected by front panel switch

Main output: 6V, 20A adjustable 4.75 to 6V.
Auxiliary output: 2x15V, 1.75A (GT6-20A) or 2x12V, 1.75A (GT6-20AB)

Soft start circuit holds down in-rush current.

L.E.D. lamps indicate presence of outputs.

Well protected. Main output: constant current limiting, overvoltage protection, optional overcurrent trip. Auxiliaries: cut-back current limiting plus auto-reset thermostat. Note: overvoltage and overcurrent trips disable all outputs.

2.1kV input/output insulation.

Low r.f.i. Meets VDE0875, curve N requirements, CISPR (publication 2) curve N and BS800.

Test procedure includes numerous switch-on cycles and elevated temperature test for maximum reliability.

Mechanically compatible with other manufacturers' units. Identical fixing, heat sink position etc.

Sample units have passed independent mechanical trials — Vibration: 2G 5-150Hz with max. displacement of 2.54mm; Bump: 1000 bumps at 30G with 6mS half sine wave pulses; Shock: 3 shocks of 25G, 25mS duration, half sine wave pulses in each mounting plane.

The Farnell GT6-20A power supply uses a combination of switching and linear control techniques to provide three independent stabilized d.c. outputs from an a.c. input. The techniques employed permit reduced dimensions, weight and internal power dissipation in comparison with conventional series regulator units.

The unit has one main output which can deliver a maximum of 6V, 20A and two completely separate auxiliary outputs, each of which can be set to a nominal 12V or 15V output and can deliver up to 1.75A.

The output voltages may be varied separately by screwdriver adjustment of front panel potentiometers. The adjustment range of the main output is 4.75V to 6V. Each auxiliary output can be adjusted over the range 11.5 to 15.5V but the unit is only specified for operation at 12V ±0.5V or 15V ±0.5V. Selection of 12V or 15V nominal output is by separate internal tap links for each auxiliary output.

Units are normally supplied from the factory with the auxiliary output tap links set to 15V but, on request, units can be supplied with both tap links set to 12V. This unit is specified by adding suffix 'B' after the model number (i.e. GT6-20AB).

Provision is made on each output for remote sensing of voltage at the load to correct for voltage drop in the load connecting leads. All the outputs may be switched on or off together by remote control and a front panel L.E.D. is provided for each output to indicate the presence of output voltage.

Current limiting is provided on each output and an optional overcurrent trip is available which disables all the outputs after approximately 200mS of current overload on the main output. Overvoltage protection is provided which disables all outputs if excess voltage appears on the main output. A 'soft-start' circuit is employed which limits the peak value of input current at switch-on.

Unit outputs may be connected in series with other outputs of similar rating and parallel operation of the auxiliary outputs is permissible.

Careful consideration has been given in the design of the unit to the problems of radio frequency interference (r.f.i.) and, in this respect, sample units have met the conducted interference requirements of VDE0875 curve N, CISPR (publication 2) curve N and BS800.

MODEL	NOMINAL OUTPUT VOLTS D.C.	VOLTAGE ADJUSTMENT RANGE	RATED OUTPUT CURRENT
GT6—20A	6 and	4·75—6V	20A
	2 x 15V	14·5—15·5V	1·75A
GT6—20AB	6 and	4·75—6V	20A
	2 x 12V	11·5—12·5V	1·75A

Option 'C': Units with optional overcurrent trip can be identified by the presence of suffix 'C' in the model number

Specification

Mains input 220/240V or 115/120V ±10%. Selected by front panel switch 45-440Hz

Outputs
Main Output 6V at 20A. Voltage adjustable 4.75 to 6V by front panel potentiometer
Auxiliary outputs 2 x 15V at 1.75A (GT6-20A) or 2 x 12V at 1.75A (GT6-20AB)
12 or 15V rails selected by internal tap changes. Voltage adjustable ±0.5V from nominal by front panel potentiometer

Output regulation *Main output:* 0.1% maximum variation
Auxiliaries: 0.01% maximum variation
Defined for a worst case combination of 0-100% load change on all outputs and ±10% line change

Ripple and noise at full load (30MHz bandwidth)
Main output: Less than 10mV r.m.s.; 50mV pk-pk
Auxiliaries: Less than 3mV r.m.s.; 20mV pk-pk

Temperature coefficient *All outputs:* ±0.01% per °C typical

Output impedence *Main output:* 100mΩ at 100kHz and 25°C typical
Auxiliaries: 250mΩ at 100kHz and 25°C typical

Transient recovery time *Main output:* typically 1mS for output to recover within 50mV following a 10-100% or 100-10% load change of 5μS rise time. Typical instantaneous deviation 350mV
Auxiliaries: typically 100μS for output to recover within 10mV following a 10-100% or 100-10% load change of 1μS rise time

Operating ambient temperature range 0°C to 50°C for full output current

Maximum operating ambient temperature 70°C. Output current derates linearly from full load at 50°C to half load at 70°C

Storage temperature range —40°C to +85°C

Hold-up time Outputs will be maintained for the duration of a missing mains cycle (28mS) at —10% mains input when the unit is supplying 5.25V at 20A and 2 x 15.5V at 1.75A (see graphs on page 3)

Switch-on surge Limited by soft-start circuit to 32A maximum peak current

Switch-on time Outputs established within 400mS

Insulation Tested at 2.1kV peak for 1 minute between a.c. input and d.c. output with all output terminals and case connected together. ±250V d.c. continuous rating between any two d.c. outputs and between each d.c. output and case. Tested to 500V d.c. for 1 minute

Remote sensing All outputs can be connected for remote voltage sensing. For the main output the load voltage plus total lead drop should not exceed 6V. For each auxiliary output, the total lead drop should not exceed 0.5V

Efficiency Better than 60%. Typically 65% at full load on all outputs

Protection *OVERLOAD Main output:* Constant current limiting set to 110% ±5% of full load current. In addition, on units with option C, all outputs are disabled after 200mS of overload on the main output
Auxiliaries: Cutback current limiting set to 110% ±5% of full load current, reducing to approximately 60% of full load current for a short circuit load. Also an auto-reset thermostat protects the unit against prolonged short circuit on the auxiliary outputs. All outputs reduce to zero when the thermostat operates
OVERVOLTAGE On main output only. Set at 6V +20%. Disables control circuit and all outputs fall to zero
FUSE The a.c. input circuit is fused

Remote on/off All outputs are reduced to zero by short circuiting the 'PROG' and '+S' terminals

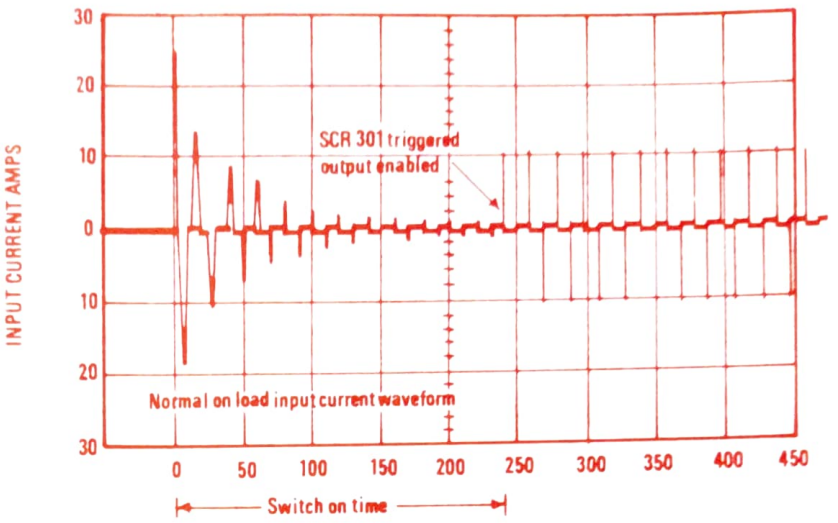
Series and parallel operation Main outputs of units should not be connected in parallel. Any number of auxiliary outputs may be connected in parallel.
The main output can be connected in series with the outputs of units with similar current rating up to a total output voltage of 250V. Auxiliary outputs can be connected in series with each other or similar outputs up to a total output voltage of 250V

Rack mounting

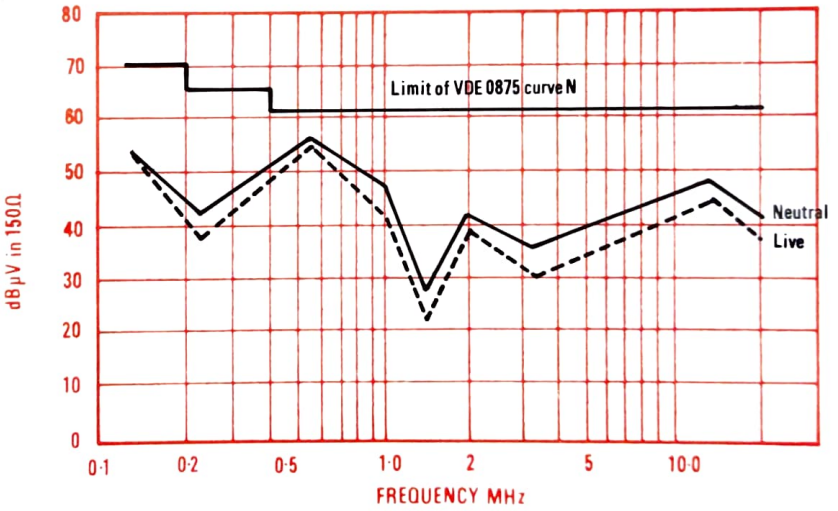
Units fit the aperture of the VERO KM4 Card Frame system (or similar) which conforms to DIN41494 standard for Eurocards small (100 x 160mm) and large (233.4 x 160mm).

Mounting metalwork is normally available from the card manufacturers.

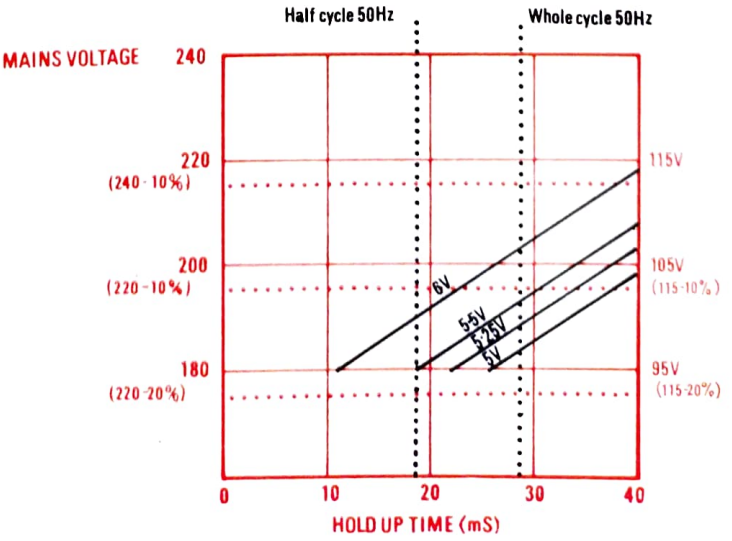
Switch-on characteristic GT6—20A (typical) 240Va.c. input



Conducted r.f. voltage on input terminals



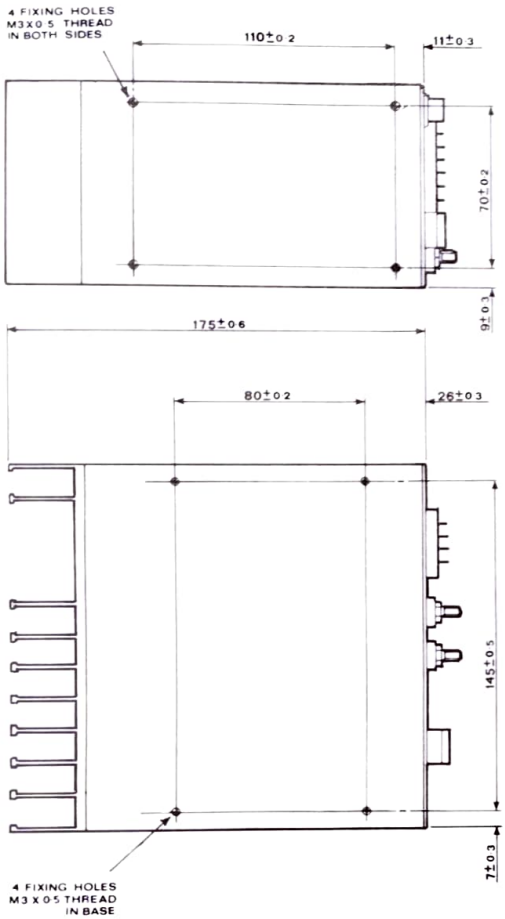
Hold-up time

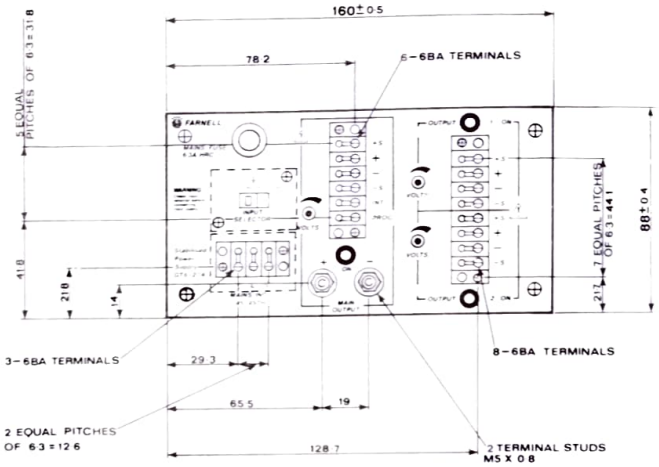


Mechanical details

(Dimensions in mm.)

Weight 3kg





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Manufactured in England by

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INSTRUCTION BOOK FOR

GT6~20A

POWER SUPPLY

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CONTENTS

INTRODUCTION

The Farnell GT6-20A power supply uses a combination of switching and linear control techniques to provide three independent stabilized d.c. outputs from an a.c. input. The techniques employed permit reduced dimensions, weight and internal power dissipation in comparison with conventional series regulator units.

Each unit may operate from either 220-240V input or 115-120V input, selected by a front panel switch.

The unit has one main output which can deliver a maximum of 6V 20A and two completely separate auxiliary outputs, each of which can be set to a nominal 12V or 15V output and can deliver up to 1.75A.

The output voltages may be varied separately by screwdriver adjustment of front panel potentiometers. The adjustment range of the main output is 4.75V to 6V. Each auxiliary output can be adjusted over the range 11.5 to 15.5V but the unit is only specified for operation at 12V ±0.5V or 15V ±0.5V. Selection of 12V or 15V nominal output is by separate internal tap links for each auxiliary output.

Units are normally supplied from the factory with the auxiliary output tap links set to 15V but, on request, units can be supplied with both tap links set to 12V. This unit is identified by the suffix 'B' after the model number (i.e. GT6-20AB).

Provision is made on each output for remote sensing of voltage at the load to correct for voltage drop in the load connecting leads.

All the outputs may be switched on or off together by remote control and a front panel L.E.D. is provided for each output to indicate the presence of output voltage.

Current limiting is provided on each output and an optional overcurrent trip is available which disables all the outputs after approximately 200mS of current overload on the main output.

Overvoltage protection is provided which disables all outputs if excess voltage appears on the main output. A 'soft-start' circuit is employed which limits the peak value of input current at switch on.

Unit outputs may be connected in series with other outputs of similar rating and parallel operation of the auxiliary outputs is permissible.

Careful consideration has been given in the design of the unit to the problems of radio frequency interference (r.f.i.) and, in this respect, sample units have met the conducted interference requirements of VDE0875 curve N, CISPR (publication 2) curve N and BS800.

Model	Nominal output volts d.c.	Voltage adjustment range	Rated output current
GT6-20A	6 and 2 x 15V	4.75 - 6V 14.5 - 15.5V	20A 1.75A
GT6-20AB	6 and 2 x 12V	4.75 - 6V 11.5 - 12.5V	20A 1.75A

Option C: Units with optional overcurrent trip can be identified by the presence of suffix 'C' in the model number

SPECIFICATION

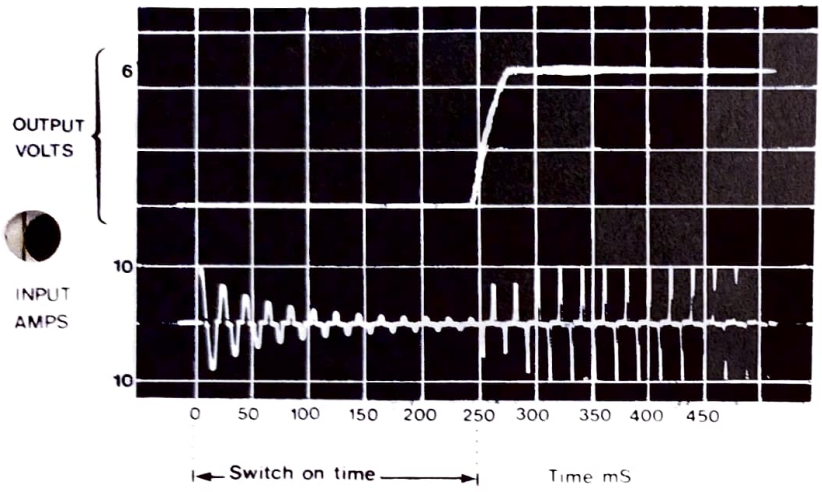
MAINS INPUT	115/120V ±10% or 220/240V ±10%. Selected by front panel switch 45-440Hz
OUTPUTS	*Main output* 6V at 20A. Voltage adjustable 4.75 to 6V by front panel potentiometer *Auxiliary outputs* 2 x 15V at 1.75A (GT6-20A) OR 2 x 12V at 1.75A (GT6-20AB) 12 or 15V rails selected by internal tap changes. Voltage adjustable ±0.5V from nominal by front panel potentiometer
OUTPUT REGULATION	*Main output:* 0.1% maximum variation *Auxiliaries:* 0.01% maximum variation Defined for a worst case combination of 0-100% load change on all outputs and ±10% line change
RIPPLE AND NOISE at full load (30MHz bandwidth)	*Main output:* Less than 10mV r.m.s.; 50mV pk-pk *Auxiliaries:* Less than 3mV r.m.s., 20mV pk-pk
TEMPERATURE COEFFICIENT	*All outputs:* ±0.01% per ^{o}C typical
OUTPUT IMPEDANCE	*Main output:* 100mΩ at 100kHz and 25^{o}C typical *Auxiliaries:* 250mΩ at 100kHz and 25^{o}C typical
TRANSIENT RECOVERY TIME	*Main output:* typically 1mS for output to recover within 50mV following a 10-100% or 100-10% load change of 5µS rise time. Typical instantaneous deviation 350mV *Auxiliaries:* typically 100µS for output to recover within 10mV following a 10-100% or 100-10% load change of 1µS rise time
OPERATING AMBIENT TEMPERATURE RANGE	0^{o}C to 50^{o}C for full output current
MAXIMUM OPERATING AMBIENT TEMPERATURE	70^{o}C. Output current derates linearly from full load at 50^{o}C to half load at 70^{o}C
STORAGE TEMPERATURE RANGE	-40^{o}C to +85^{o}C
HOLD-UP TIME	Outputs will be maintained for the duration of a missing mains cycle (28mS) at -10% mains input when the unit is supplying 5.25V at 20A and 2 x 15.5V at 1.75A (see graphs on page 5)
SWITCH-ON SURGE	Limited by soft-start circuit to 32A maximum peak current
SWITCH-ON TIME	Outputs established within 400mS

INSULATION	Tested at 2.1kV peak for 1 minute between a.c. input and d.c. output with all output terminals and case connected together. ±250V d.c. continuous rating between any two d.c. outputs and between each d.c. output and case. Tested to 500V d.c. for 1 minute
REMOTE SENSING	All outputs can be connected for remote voltage sensing. For the main output the load voltage plus total lead drop should not exceed 6V. For each auxiliary output, the total lead drop should not exceed 0.5V
EFFICIENCY	Better than 60%. Typically 65% at full load on all outputs
PROTECTION	*OVERLOAD* *Main output:* Constant current limiting set at 110% ±5% of full load current. In addition, on units with option C, all outputs are disabled after 200mS of overload on the main output *Auxiliaries:* Cutback current limiting set to 110% ±5% of full load current, reducing to approximately 60% of full load current for a short circuit load. Also an auto-reset thermostat protects the unit against prolonged short circuit on the auxiliary outputs. All outputs reduce to zero when the thermostat operates *OVERVOLTAGE* On main output only. Set at 6V +20%. Disables control circuit and all outputs fall to zero *FUSE* The a.c. input circuit is fused
REMOTE ON/OFF	All outputs are reduced to zero by short circuiting the 'PROG' and '+S' terminals
SERIES AND PARALLEL OPERATION	Main outputs of units should not be connected in parallel. Any number of auxiliary outputs may be connected in parallel. The main output can be connected in series with the outputs of units with similar current rating up to a total output voltage of 250V. Auxiliary outputs can be connected in series with each other or similar outputs up to a total output voltage of 250V

Dimensions (excluding terminals)

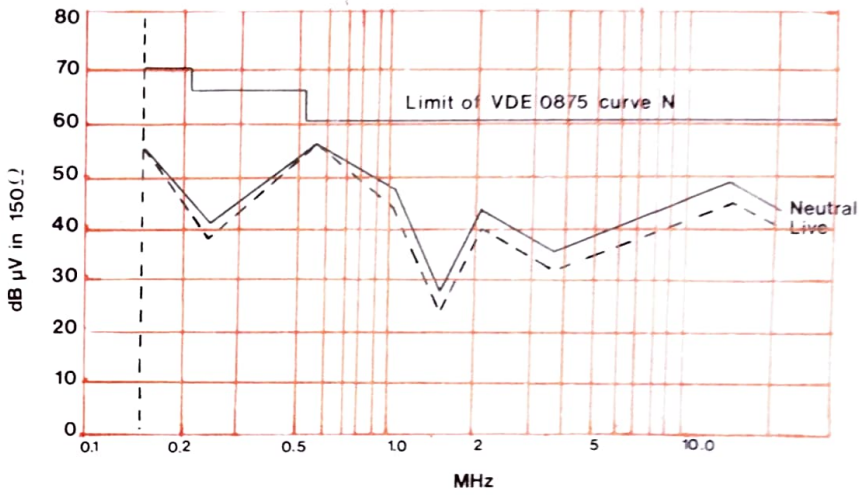
Height 88mm, Width 160mm, Depth 175mm, Weight 3kg

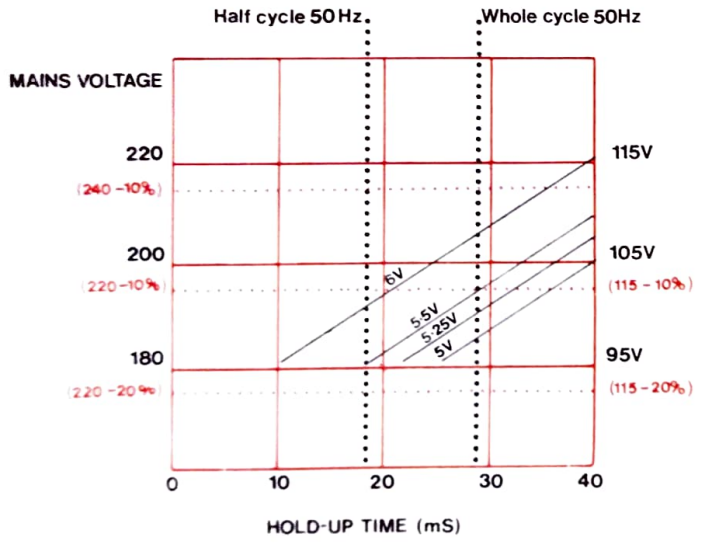
SWITCH-ON TIME GT6-20A (TYPICAL)
240V a.c. INPUT

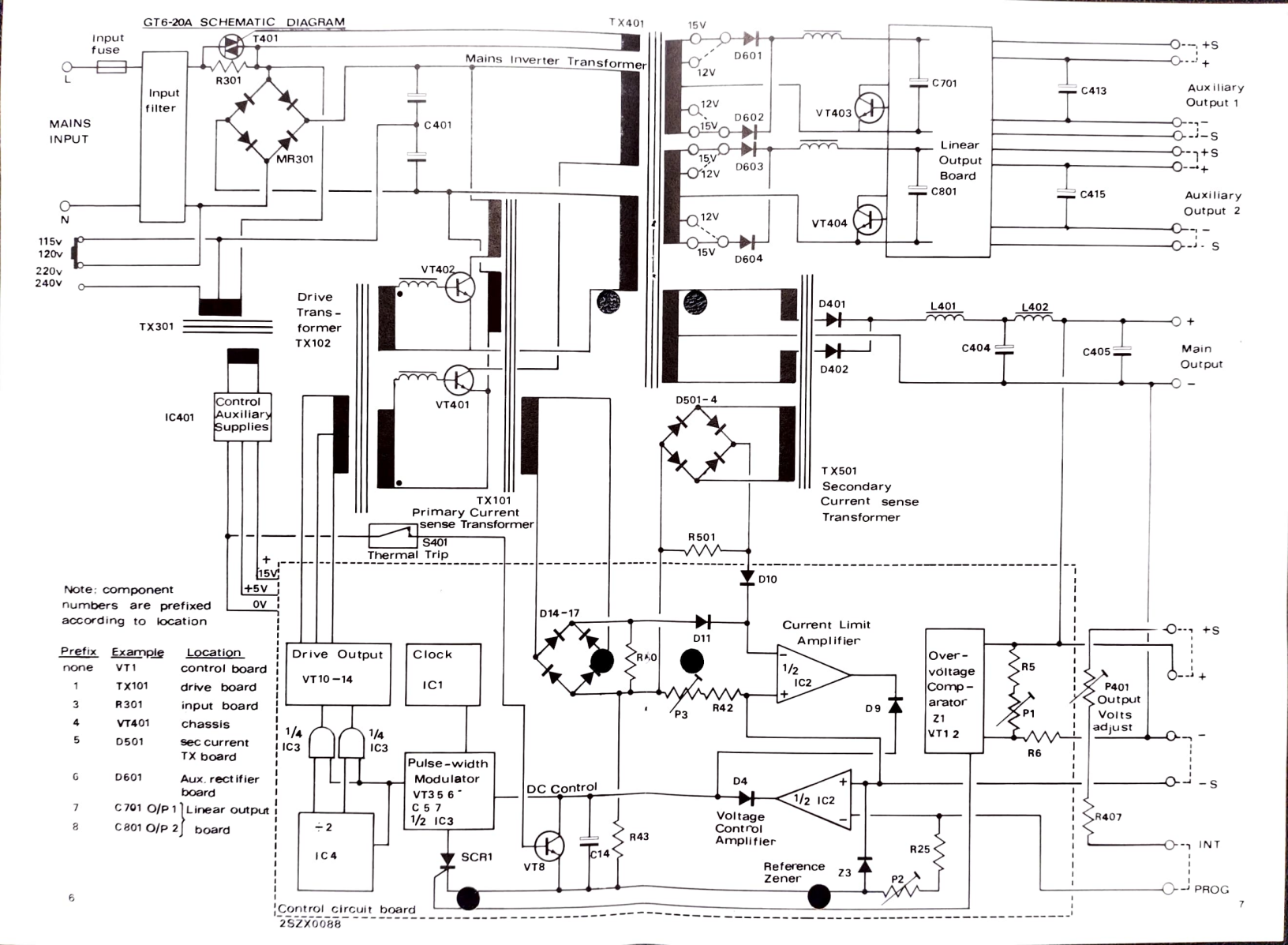


CONDUCTED R.F. VOLTAGE ON INPUT TERMINALS

Conducted and radiated interference were within VDE 0875 curve N limits on a sample GT6–20A independently assessed






GT6-20A SCHEMATIC DIAGRAM
Input fuse
L
N
MAINS INPUT
Input filter
T401
R301
MR301
C401
Mains Inverter Transformer
TX401
115v
120v
220v
240v
TX301
Drive Transformer TX102
VT402
VT401
IC401
Control Auxiliary Supplies
TX101
Primary Current sense Transformer
S401
Thermal Trip
15v
12v
D601
D602
D603
D604
VT403
VT404
C701
Linear Output Board
C801
C413
C415
Auxiliary Output 1
Auxiliary Output 2
+S
-S
D401
D402
L401
L402
C404
C405
Main Output
D501-4
TX501
Secondary Current sense Transformer
R501
D10
D14-17
D11
R40
P3
R42
Current Limit Amplifier
1/2 IC2
D9
Over-voltage Comparator Z1 VT12
R5
P1
R6
P401 Output Volts adjust
R407
INT
PROG
+15V
+5V
0V
Note: component numbers are prefixed according to location
Prefix Example Location
none VT1 control board
1 TX101 drive board
3 R301 input board
4 VT401 chassis
5 D501 sec current TX board
6 D601 Aux. rectifier board
7 C701 O/P 1 } Linear output
8 C801 O/P 2 } board
Drive Output VT10-14
Clock IC1
1/4 IC3
1/4 IC3
÷2 IC4
Pulse-width Modulator VT356 C57 1/2 IC3
SCR1
DC Control
VT8
C14
R43
D4
1/2 IC2
Voltage Control Amplifier
Reference Zener
Z3
R25
P2
Control circuit board
2SZX0088
6
7

WARNING !

Hazardous voltages exist at various points within the unit since major areas of the circuit are at mains potential. DO NOT REMOVE ANY COVER PLATE WITHOUT FIRST DISCONNECTING THE INPUT SUPPLY.

Mains input

The mains input terminals are located on the 3-way terminal block at the left hand side of the unit front panel and are marked L (live), N (neutral) and ⏚ (earth).

The unit will operate from either a 115-120V supply or a 220-240V supply by setting the front panel switch before connecting the supply

WARNING

Incorrect input selection may result in damage to the unit.

NOTE
In normal operating mode ensure that all links are present and tightly connected on the front panel terminal block(s).

Output connections

The main output is taken from the large studs on the front panel marked OUTPUT '+' and '-'. Both auxiliary outputs are taken from the 8-way terminal block on the front panel from the terminals marked OUTPUT 1 '+' and '-' and OUTPUT 2 '+' and '-'. For each auxiliary output there are two metal links on the terminal block which link the '+' and +S terminals and the '-' and -S terminals. These should not be removed unless the output voltage is to be remotely sensed.

A front panel L.E.D. is provided for each output to indicate the presence of output voltage.

Remote sensing

Main output

The remote sensing terminals for the main output are situated on the 6-way terminal block on the front panel. As supplied the sense terminals for the main output marked '+S' and '-S' are connected to terminals marked '+' and '-' by metal links (The '+' and '-' terminals are connected internally to the main output studs but on no account should load current be drawn from them). For remote sensing applications both metal links are removed and the '+S' and '-S' terminals are connected to the remote load, observing correct polarity. The total voltage drop in the output connecting leads plus the load voltage should not exceed 6V.

Note: The metal link between the 'PROG' and 'INT' terminals should not be removed.

Auxiliary output

For remote sensing of the auxiliary outputs remove the metal links between the '+' and '+S' and the '-' and '-S' terminals and connect the '+S' and '-S' terminals to the remote load, observing polarity. The total voltage drop in the output connecting leads plus the load voltage should not exceed 15.5V on the 15V auxiliary tap or 12.5V on the 12V auxiliary tap.

Remote on/off

All the outputs may be reduced to zero by short-circuiting the 'PROG' and '+S' terminals on the 6-way terminal block.

Output hold-up

All the outputs will be maintained for the duration of a missing mains cycle (28mS) when the mains input is 10% below the nominal input (220 or 240V) and the unit is supplying 5.25V 20A and 2 x 15.5V 1.75A.

Series and parallel operation

The main output of the unit may not be connected in parallel with another output. Any number of auxiliary outputs may be connected directly in parallel with each other or with outputs of the same voltage rating.

Any output can be connected in series with other outputs of similar current rating up to a total output voltage of 250V.

Mounting and ventilation

The units are provided with M3 threaded fixing holes in the base and on both sides. N.B. Fixing screws should not penetrate more than 6mm into the unit. 8mm long fixing screws are supplied.

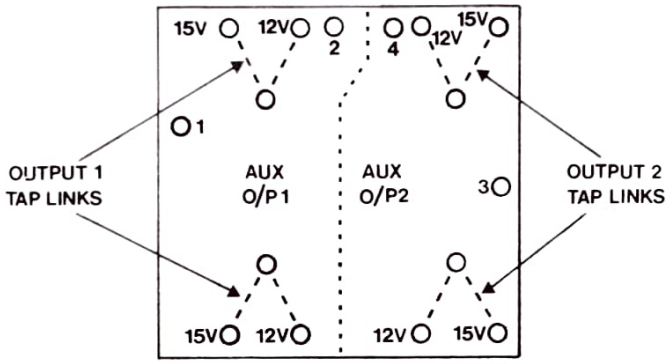
Cooling is by natural convection and provision should be made to allow free air flow into the bottom and out of the top of the unit, particularly in the area of the main heatsink. If the unit is to be mounted on a flat plate, ventilation holes, corresponding to the unit mesh cover holes and the heatsink plan area, should be punched in the plate, or the unit raised off the plate by at least 25mm.

Units may be operated, if necessary, in an inverted position without derating.

Auxiliary outputs tap changing

Units are supplied from the factory with both auxiliary output taps set to 15V (or for the GT6-20B, set to 12V). If it is required to change the tap setting on either of the auxiliary outputs the following procedure should be followed.

Remove the unit cover and lower the right hand side panel to give access to the inverter transformer. The inverter transformer is the large ferrite-cored transformer mounted on the side panel and it has a small circuit board mounted on it which carries the tap change links as shown below.



To change the output voltage tap for a particular output, remove the two links associated with that output and replace them in the indicated 12 or 15V positions as required.

Refit the side tray carefully, ensuring that no wires are trapped. Refit the cover, connect power to the unit and adjust the front panel mounted auxiliary output voltage setting potentiometer to the required voltage which, for full output current, should be within 0.5V of the selected 12 or 15V tap.

CIRCUIT DESCRIPTION

General

The following is a simplified description of the operation of the GT6-20 circuit and should be read with reference to the schematic diagram on pages 6 and 7.

The mains supply is connected through the input fuse, low-pass input filter and soft start circuit to bridge rectifier MR302, the d.c. output of which is fed to C401. This circuit limits the charging current of C401 at switch on . Selecting for 115-120V input connects the unit input circuit as a voltage doubler. The primary windings of the main inverter transformer TX401 are switched alternately across the d.c. line at C401 by the switch transistors VT401 and VT402.

The main, centre-tapped, secondary output of TX401 is rectified by D401 and D402 and applied to the output terminals after filtering by L401, C404, L402 and C405.

Control of the main output voltage is achieved by pulse-width modulation of the 'ON' drive signals to the inverter switch transistors.

The two auxiliary output secondary windings of TX401 are rectified by D601, D602, D603 and D604 and smoothed by C701 and C801 to provide two separate unregulated d.c. lines. These are then independently regulated, using conventional linear control techniques, by the linear output board circuit and the series regulator transistors VT403 and VT404. The two controlled d.c. outputs then appear across C413 and C415.

Soft start

The charging current for C401 at switch on is limited by resistor R301, and the unit output is inhibited by VT8 and C14.

When the voltage at C14 rises, output is established and R301 by-passed by triac T401.

Output voltage control (main output)

A proportion of the main output voltage from the potential divider (R407, P401, R25 and P2) is compared with the internally generated reference voltage from Z3 by the voltage control amplifier (half of IC2). Any difference between these two voltages is amplified to provide the d.c. control signal for the pulse-width modulator.

This circuit produces a train of pulses whose repetition frequency is determined by the clock (IC1) and pulse width determined by the d.c. control signal. The mark/space ratio of these pulses is greatest when the control signal is high.

IC4 and two gates of IC3 then steer the controlled mark/space ratio pulses alternately to each switch transistor (VT401 and VT402) via the drive output stage and the drive transformer (TX102). The switch transistors then conduct alternately with a period of non-conduction between to give an alternating voltage across the primary windings of transformer TX401 from the d.c. line at C401.

This alternating voltage is stepped-down by TX401 and rectified by D401 and D402 to produce a voltage whose d.c. average is a function of the conduction pulse width of the switch transistors and hence of the output of the voltage control amplifier. The rectified secondary voltage is then filtered by L401, C404, L402 and C405 to provide a d.c. voltage at the main output terminals.

Overcurrent protection (main output)

The main output current is sensed at the main secondary winding by current transformer TX501. At this point there are a.c. current pulses with amplitude proportional to the d.c. output current. Transformer TX501 steps down the current pulses and these are rectified to produce voltage pulses across R501 proportional to the main d.c. output current. The peak voltage across R501 is compared with a proportion of the reference voltage from Z3 by the current limit amplifier (half of IC2). If the d.c. output current (and hence the voltage across R501) exceeds the level set by P3, the output of the current limit amplifier reduces, forward biassing diode D9 and overriding the signal from the voltage control amplifier. The unit output voltage reduces to limit the output current and the voltage control amplifier output increases, reverse biassing diode D4. Under these conditions control of the unit is determined by the output of the current limit amplifier.

Note that the current flow in the primary of the inverter transformer is sensed at the primary current transformer TX101 and this also feeds the current limit amplifier. In normal operation the current limit is determined solely by the signal from the secondary current transformer, but the inclusion of the primary current transformer gives additional protection for the switch transistors.

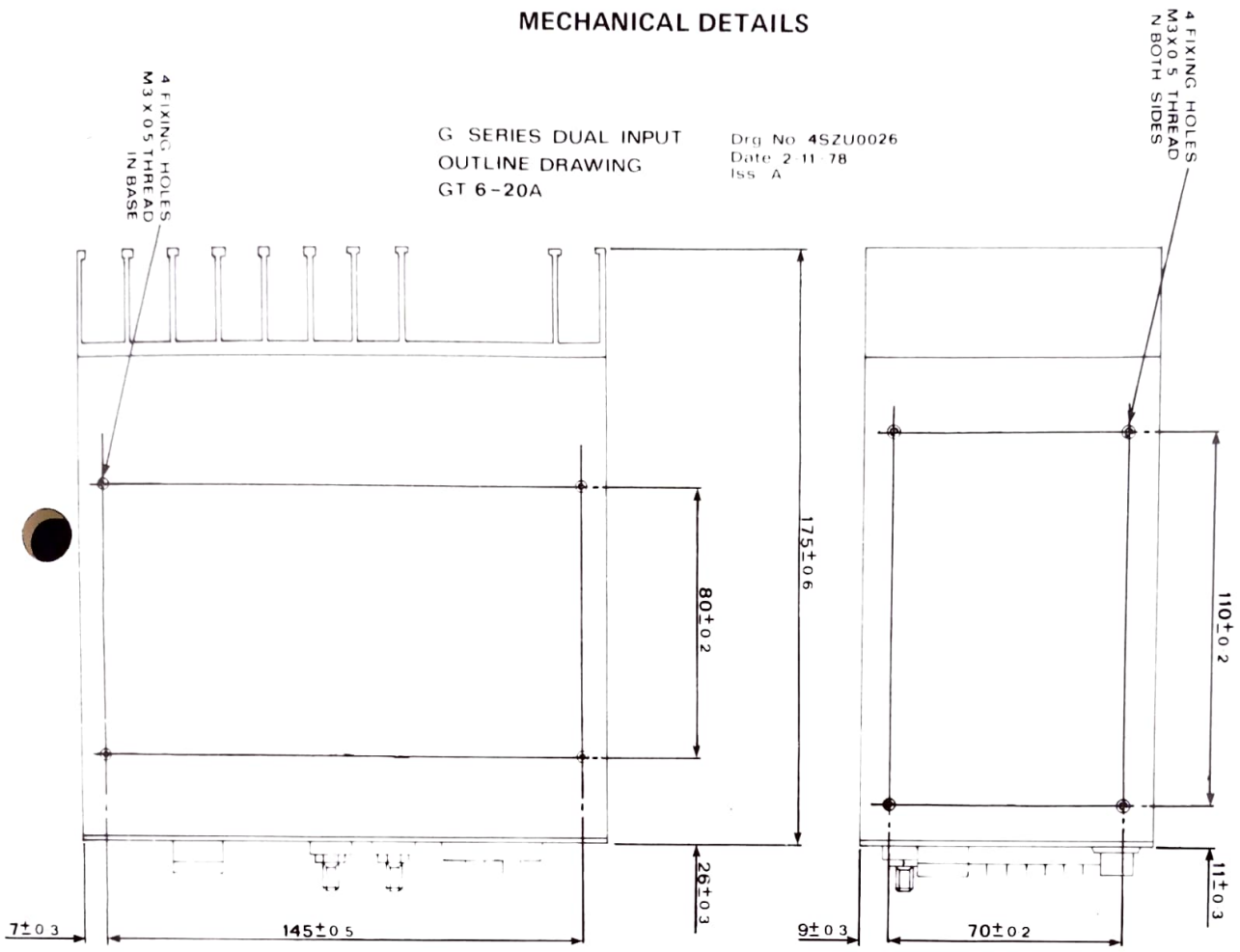
Overvoltage protection (main output)

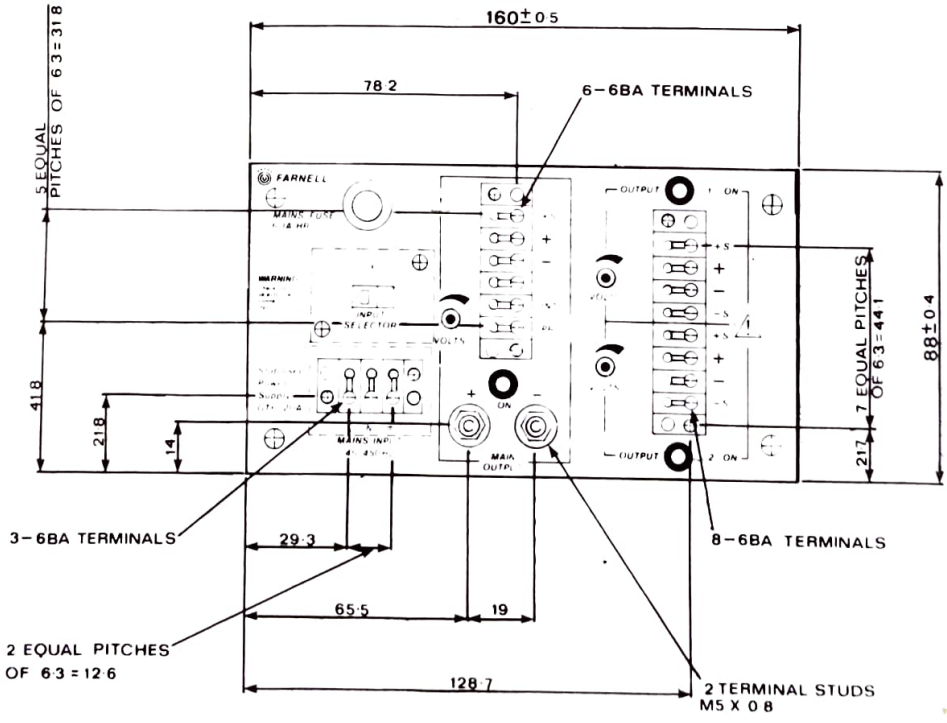
A proportion of the main output voltage is compared with the voltage across Z1. If the output voltage exceeds the level set by P1, the overvoltage comparator provides a positive gate signal to thyristor SCR1. The output of the pulse-width modulator (and hence the unit output) is inhibited as SCR1 conducts.

MECHANICAL DETAILS

G SERIES DUAL INPUT
OUTLINE DRAWING
GT 6-20A

Drg No 4SZU0026
Date 2-11-78
Iss A





MAINTENANCE

Guarantee

The equipment supplied by Farnell Instruments Ltd. is guaranteed against defective material and faulty manufacture for a period of twelve months from the date of despatch. In the case of material or components employed in the equipment but not manufactured by us, we allow the customer the period of any guarantee extended to us.

The equipment has been carefully inspected and submitted to comprehensive tests at the factory prior to despatch. If, within the guarantee period, any defect is discovered in the equipment in respect of material or workmanship and reasonably within our control, we undertake to make good the defect at our own expense subject to our standard conditions of sale. In exceptional circumstances and at the discretion of the Service Manager, a charge for labour and carriage costs incurred may be made.

Our responsibility is in all cases limited to the cost of making good the defect in the equipment itself. The guarantee does not extend to third parties, nor does it apply to defects caused by abnormal conditions of working, accident, misuse, neglect or wear and tear.

Maintenance

In the event of difficulty, or apparent circuit malfunction, it is advisable to telephone (or telex) the Service Department or your local Sales Engineer or Agent (if overseas) for advice before attempting repairs.

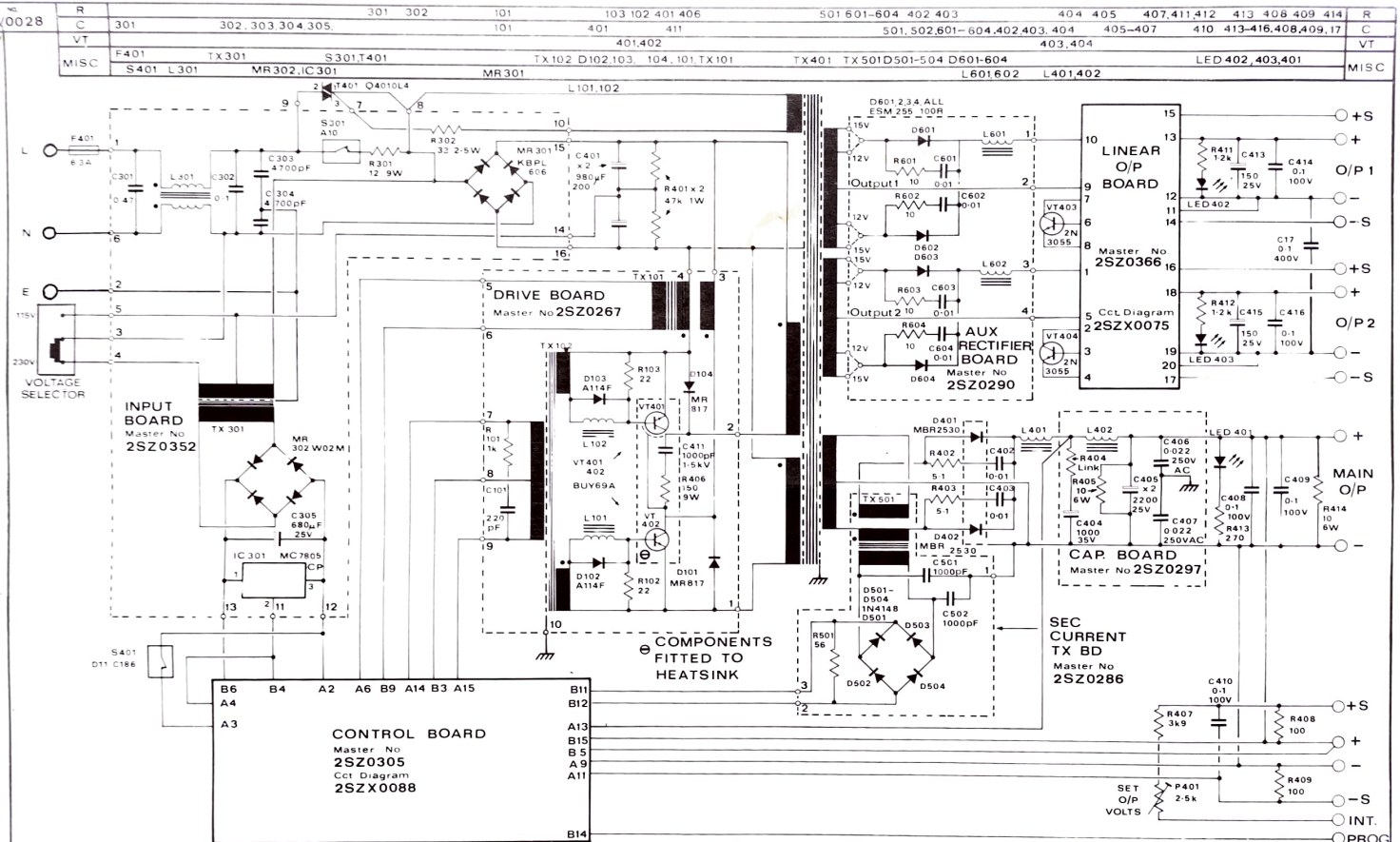
For repairs it is recommended that the complete unit be returned to:-

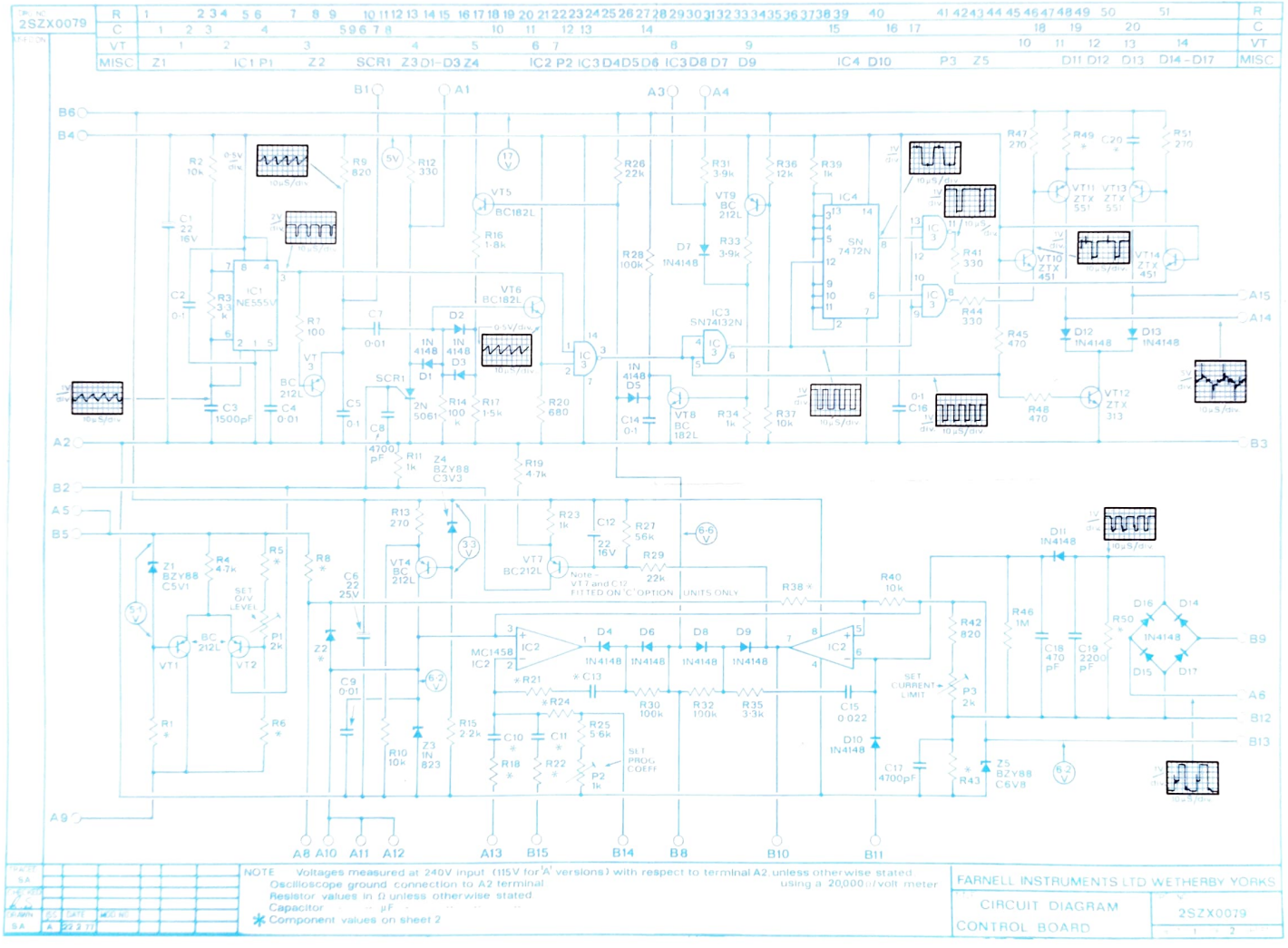
The Service Department
Farnell Instruments Ltd.
Sandbeck Way
Wetherby, Yorkshire
LS22 4DH.
Tel: 0937 63541 Telex: 557294

Please ensure adequate care is taken with packing and arrange insurance cover against transit damage or loss.

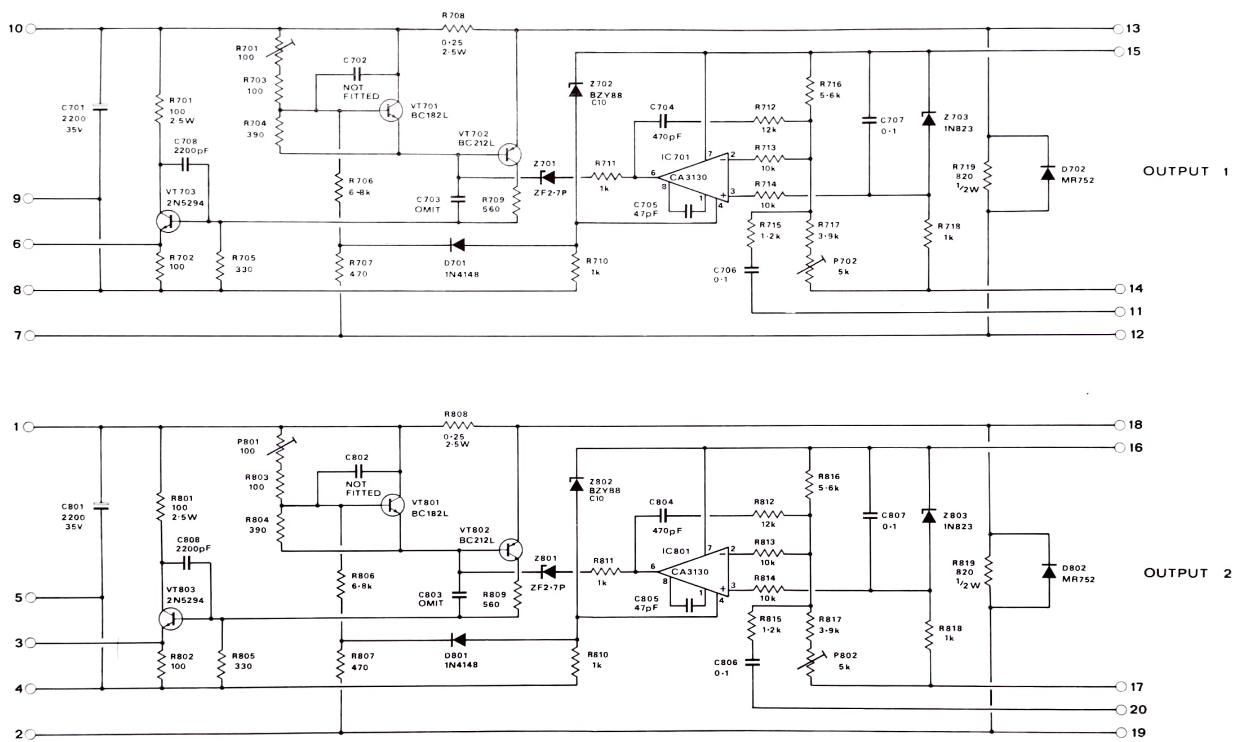
Warning! - Hazardous voltages (see page 8)

If repairs are to be attempted by the customer these should be undertaken only by personnel conversant with this type of equipment.


DRAWING NO 2SZV0028
USED ON
R 301 302 101 103 102 401 406 501 601-604 402 403 404 405 407,411,412 413 408 409 414
C 301 302,303,304,305, 101 401 411 501,502,601-604,402,403,404 405-407 410 413-416,408,409,17
VT 401,402 403,404
MISC F401 TX301 S301,T401 TX102 D102,103, 104, 101,TX101 TX401 TX501 D501-504 D601-604 LED 402,403,401
S401 L301 MR302,IC301 MR301 L601,602 L401,402
L101,102
D601,2,3,4 ALL ESM 255 100R
LINEAR O/P BOARD
Master No 2SZ0366
Cct Diagram 2SZX0075
+S
+
O/P 1
-
-S
+S
+
O/P 2
-
-S
AUX RECTIFIER BOARD
Master No 2SZ0290
Output 1
Output 2
DRIVE BOARD
Master No 2SZ0267
INPUT BOARD
Master No 2SZ0352
VOLTAGE SELECTOR
L
N
E
115V
230V
F401 6.3A
TX 301
MR 302 W02M
C305 680µF 25V
IC 301 MC7805 CP
S401 D11 C186
CONTROL BOARD
Master No 2SZ0305
Cct Diagram 2SZX0088
B6 B4 A2 A6 B9 A14 B3 A15
A4
A3
B11
B12
A13
B15
B5
A9
A11
B14
COMPONENTS FITTED TO HEATSINK
CAP. BOARD
Master No 2SZ0297
MAIN O/P
SEC CURRENT TX BD
Master No 2SZ0286
SET O/P VOLTS
P401 2·5k
INT.
PROG
RESISTOR VALUES IN Ω UNLESS OTHERWISE STATED
CAPACITOR VALUES IN µF UNLESS OTHERWISE STATED
FARNELL INSTRUMENTS LTD WETHERBY
TITLE CONNECTION DIAGRAM GT6-20A TRIPLE O/P UNITS
DRAWING NO 2SZV0028
SHEET 1 OF 1 SHEETS
SCALE
DIMENSIONS IN MM
TRACED
CHECKED A.K. C 1-9-78 Q4921 B 7.8.78 Q4855
DRAWN A.M. ISS A 25.7.78 DATE MOD NO


2SZX0079
NOTE Voltages measured at 240V input (115V for 'A' versions) with respect to terminal A2 unless otherwise stated.
Oscilloscope ground connection to A2 terminal.
Resistor values in Ω unless otherwise stated.
Capacitor values in µF unless otherwise stated.
* Component values on sheet 2
Voltages measured using a 20,000Ω/volt meter
FARNELL INSTRUMENTS LTD WETHERBY YORKS
CIRCUIT DIAGRAM
CONTROL BOARD
2SZX0079

DRAWING No 2SZX0075			
	R	701,702 · 705 · 703,704 · 706,707 · 708 · 709 · 710 · 711 · 712,713,714,715,716,717 · 718 · 719	R
	R	801,802 · 805 · 803,804 · 806,807 · 808 · 809 · 810 · 811 · 812,813,814,815,816,817 · 818 · 819	R
USED ON GT6-20 (F790)	C	701,801 · 708,808 · 702 802 · 703 803 · 704,804,705,805,706,806 · 707,807	C
	VT	703,803 · 701,801 · 702 802	VT
	MISC	P701,P801 · D701,D801 · Z701,Z801,Z702,Z802 · IC701,IC801 · P702,P802 · Z703,Z803 · D702,D802	MISC



NOTE –
RESISTOR VALUES IN Ω UNLESS STATED OTHERWISE
CAPACITOR VALUES IN μF " " "

TRACED			
CHECKED	K.O.		
DRAWN	ISS	DATE	MOD No
D.WOJ	A	17-2-77	–

TOLERANCES
MATERIAL
SCALE
PROTECTIVE FINISH
DIMENSIONS IN M.M.

FARNELL INSTRUMENTS LTD. WETHERBY, YORKS.

TITLE: CIRCUIT DIAGRAM
LINEAR OUTPUT BOARD
'G' SERIES

DRAWING No. 2SZX0075

SHEET 1 OF 1 SHEETS